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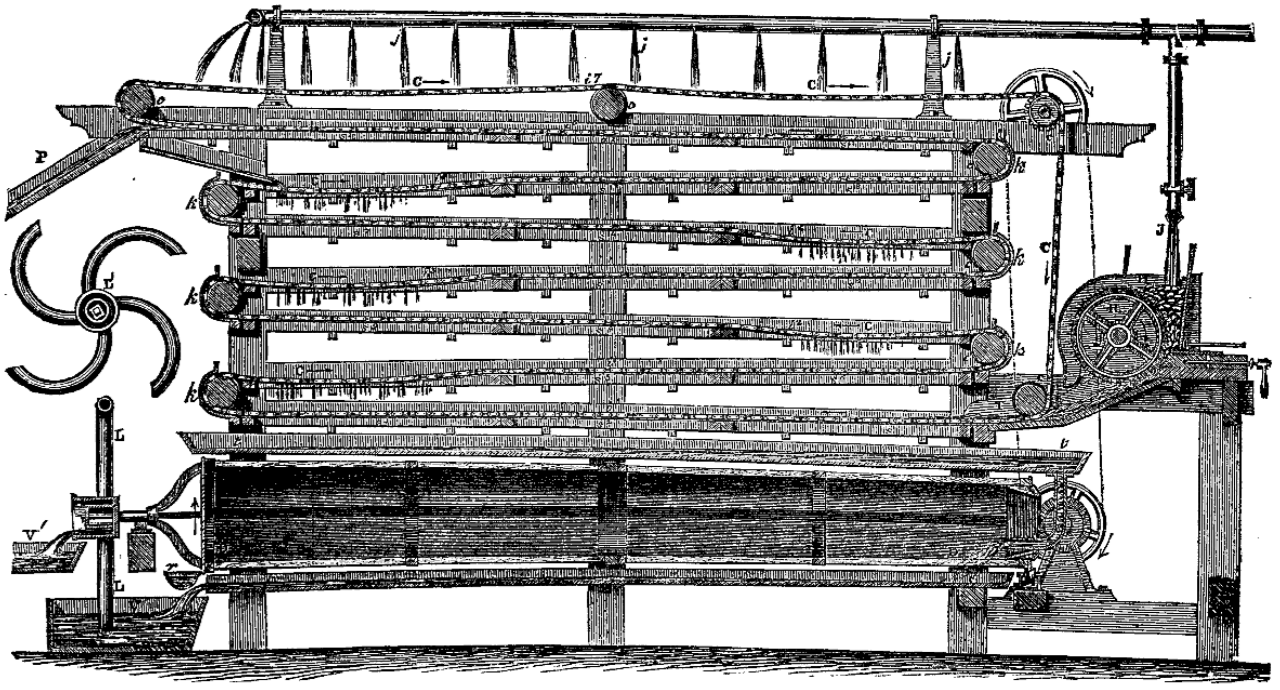
FRENCH POTATO STARCH MACHINE.

Owing to the failure of the potato crops in so many parts of our country during the past three years, this tuber has not been so extensively used for making starch; corn starch has supplanted it. But as the corn crop is said to be a failure in so many parts of our country this year, and as so many potatoes for years past, after having been gathered apparently sound, have commenced to rot, we think it no more than a wise precaution to use many of them in the manufacture of starch, when the crops are good, and where they cannot conveniently be carried to distant markets.

We here present a longitudinal vertical section of the machine which is employed in France for preparing potatoe starch, and although it is one made on a large scale for extensive manufacturing establishments a small one can equally well be constructed for any manufactory, according to its business. Our object principally is to direct attention to the subject, the more especially as there are many other tubers now wild and never used, of which good starch can be made by the same process as that for making potato starch.

The first process is to soak the potatoes in water for about six hours, this softens the skin and assists in its removal; they are then passed through a hopper into a cylindrical cage, and washed by revolving the cage in a trough of water, a stream falling on the cage; all the earthy matter and much of the skin are thus removed. The potatoes are then fit to be placed in the rasping machine, here represented. R is a rasp cylinder having toothed knives, or saws in its circumference, and made like "Parkhurst's Gin." This rasp cylinder moves at a high velocity, in the hopper, H, which is so contrived that by hanging one of its sides,



s, upon an axis near the top, and keeping the lower part of the same side pressed in towards the rasp, it will yield, if a stone should get into the hopper. A stream of water, J, falls upon its surface, and assists the centrifugal action of the rasp in clearing its surface of the pulp, which passes down a trough, T, and thence to a series of wire gauze sieves, or strainers, mounted in fixed frames, one above the other. The pulp is first passed over the sieve, s', and then raised and passed over the other sieves, s^2, to s^6, by scrapers attached to an endless articulated chain, C C, moving on rollers, *c c*. There are two of these chains, one on each side of the sieves, only one is shown. K K is a box on the rollers, *c c*. Jets of water constantly play on the top sieve frame, and it trickles down through all the others, and by the time the pulp arrives at the discharging spout, P, it is thoroughly washed. The water charged with the fecula, is received in the trough, *t*, and then passed into the cylindrical sieve, D, of fine wire gauze, which is kept revolving on a shaft. Here the remaining portion of the fibrous part of the starch cells, which escaped separation by the sieve frames, are separated from the real starch. This fine pulp is collected in the small vat, *r*, while the starch water passes into a trough, *t'*, and then into a vat, V, from which the centrifugal water lifter, L, (separate figure) revolving on the axis of D, raises it into the trough, V', from which it runs into the depository vats. The wire gauze of the frame, s', s^2, &c., increases in fineness from the top. At each stage are plates of galvanized iron curved so as to retain a portion of the water from the jets, *j j*, and thus act as a momentary stop for the pulp in its passage across the sieve frames; this prevents the pulp from forming into knots.

The starch water is received into clean wooden depositing vats from V, when it soon deposits the starch at the bottom; the clean water is then run off and the starch put upon cloths to drain, these being contained on trays with perforated bottoms. These are placed on floors of well dried plaster of Paris, which in twenty-four hours absorbs the moisture, after which it is broken up in lumps, and placed on shelves in a drying house. The pieces are turned over occasionally, and when they begin to crack the drying is completed at a hot stove, about 136°. When dry, it is batted through a fine sieve. [Red potatoes contain the most starch—about eighteen per cent.] Potatoes may be kept for a year or more at the temperature of freezing water, without losing starch. Small potatoes contain most starch. If germinating potatoes are used for making starch, cattle must not be fed on the residue, as is done with firm ripe potatoes, as the shoots of germinating potatoes contain *solanine*, a poisonous substance, which will paralyze their limbs. Potatoes for making starch should not be allowed to ferment, as this action leads to a great loss of starchy matter.

Starch is not soluble in cold water, but it is in hot.

Civil Superintendence at the Armories.

The administration has carried into effect the recent law of Congress, and removed the military superintendents of the armories at Springfield and Harper's Ferry. Erskine S. Allen, of Springfield, is appointed acting superintendent of the establishment there, and William Byington at Harper's Ferry. These gentlemen were the master armorers under the military system. The old system of employing military superintendents was a source of continual disturbance between them and the workmen, who being independent mechanics, were not disposed to submit to a military discipline.—[Philadelphia Ledger.

Locomotive on a Table.

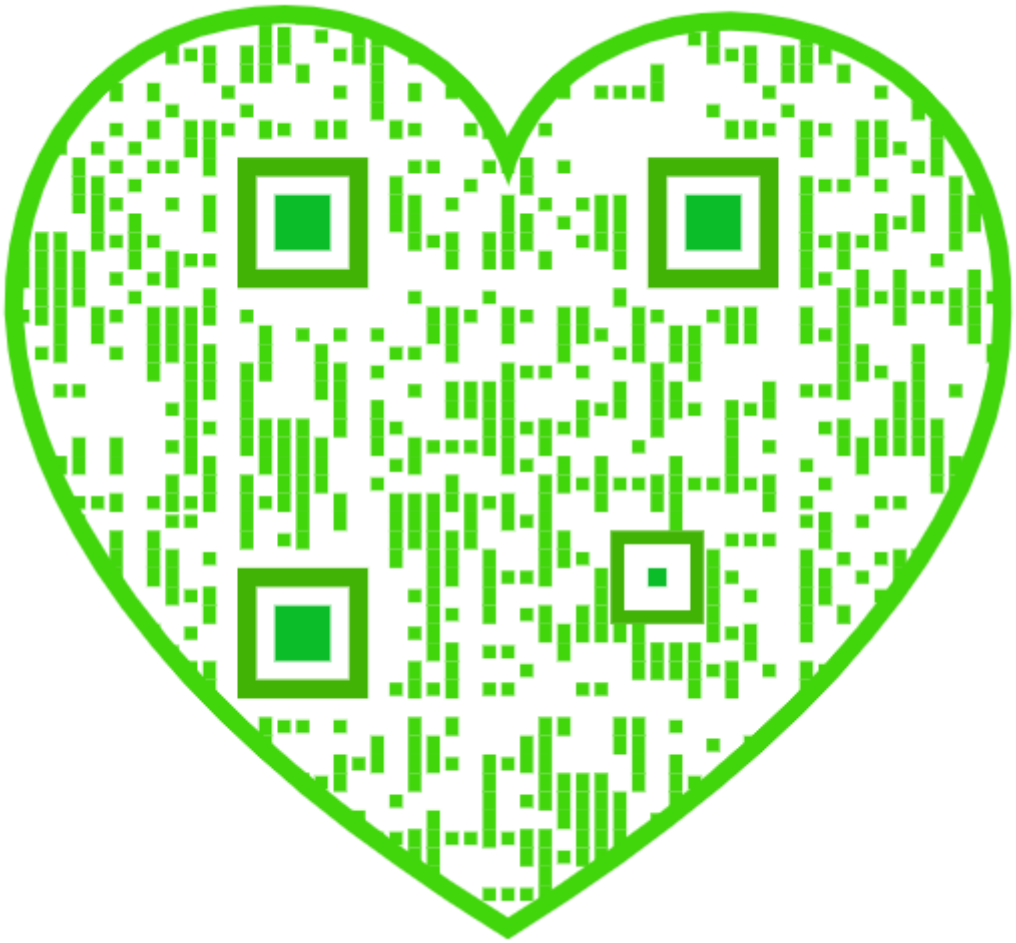
An ex-postmaster of Boston is in Germany, and sends home an account of a dinner to a railway congress, at which a locomotive appeared upon the table, to which was attached a train loaded with dishes of the choicest and most solid food. The succulent train advanced slowly, in imitation of the passenger trains upon all German roads. After having made the tour of the table without stopping; in order to give a view of the good things with which it was freighted, the train again started, making a station in front of each guest, and permitting him to fill his plate according to his appetite and fancy.

Light by Electricity.

M. Regnault, Director of the Rouen telegraph, in France, has produced light by electricity for four consecutive months, for the Napoleon Docks, accommodating 300 workmen. His report of the experiment is interesting. Two large sized batteries were used, the expense of each being per evening—wages of workmen 4·50f.; mercury 5f.; zinc 4·50; charcoal points 1·40; nitric acid 1·80; sulphuric acid 1·84—making 19·04 francs per battery: or $7,62 per evening for both batteries, or about one mill per man. The work can be done without danger. The report remarks that electro-lighting can be cheaply established on ship board, and is not like other lights liable to be extinguished in a storm.

So far as it goes, the report is satisfactory, but if we had the price of the apparatus, not the mere waste of metals, charcoal, and acid, and the expense of keeping it in order before us, we might form a more substantial idea of its economy, in comparison with gas. We do not believe that light by the burning of charcoal points by electricity can be produced as cheaply as from gas.

The next number of the "Scientific American" will contain several fine engravings of different mechanical subjects.



New Inventions.

Tempering and Flattening Saws.

William Clemson, of Boston, Mass., has made an important improvement under the above head. It consists of two iron plates placed horizontally one above the other, these plates being heated over a suitable fire-place. The tempering and flattening of the saw are effected simultaneously, by drawing the saw between the heated plates. As the saw passes between, it absorbs sufficient heat from the plates to effect the necessary tempering, while the flattening is done by the pressure of the upper plate. When a saw has been previously hardened it requires to receive a certain degree of heat before passing through the plates; if not sufficiently heated, it will break during the process. On the other hand, if too hot, it will spring back to its original unevenness after having been drawn through. To prevent this, the edges of the plates where the saw enters are beveled in such a manner, that before the saw arrives between them, every part of it becomes heated by radiation. The usual steps to secure a patent have been taken.

Instrument for Measuring the Speed of Ships.

This is the invention of John De Graw, of New York city. It consists in placing a tube extending down below the surface of the water, upon the outside of the vessel. The lower end of the tube is furnished with a piston, beneath which is an aperture having a flaring mouth piece. The water rushes through the mouth piece and lifts the piston to a hight proportionate to the speed of the ship. The piston is connected with an index located in some convenient position, whereby the apparent velocity of the vessel is at all times exhibited to the eye, in miles. An opening is made in the tube, both above and below the piston, through which the fluid enters; so that whether the density of the water at the base of the tube is increased or diminished, the pressure on the piston is equalized; the only operating force being that derived from the entrance of the water through the flaring mouth piece.—Measures have been taken to secure a patent.

Self-Setting Rat Trap.

L. A. Harper, of Russellville, Kentucky, has taken measures to secure a patent for the above invention. It consists in arranging a tilting decoy passage, and with it combining a drop door, which is operated by a spring trigger, in such a manner that as soon as the animal touches the bait, he is caught, and his weight made use of to set the trap for another customer. The passage into which the animal first enters, has the cellar floor for a bottom, so that the odorific senses of the rat are not likely to be offended when he approaches the bait.

New Butter Worker.

This consists in placing the butter within an endless sack or bag, which revolves between fluted rollers, in such a manner that the butter is constantly being operated upon by the rollers. One portion of the sack passes through water, whereby the butter is washed as often as desirable, during the operation. Ezekiel Gore, of Bennington, Vermont, is the inventor. Steps to secure a patent have been taken.

Daguerreotypes Attached to Monuments.

George R. Willmot, of Meriden, Ct., has taken measures to secure a patent for an improved method of attaching daguerreotype plates to monuments. The daguerreotype is placed within an air-tight box, having an ornamented front, and the box is then secured in an aperture made for the purpose, in the side of the monument. A convenient slide, upon the exterior, serves as a protection from the weather and also to exclude light, and thus preserve the picture from injury.

To Correspondents.

We have no room to devote to you this week, as the index, which is valuable, takes up a great part of the paper. In the next number we shall attend to your wants.

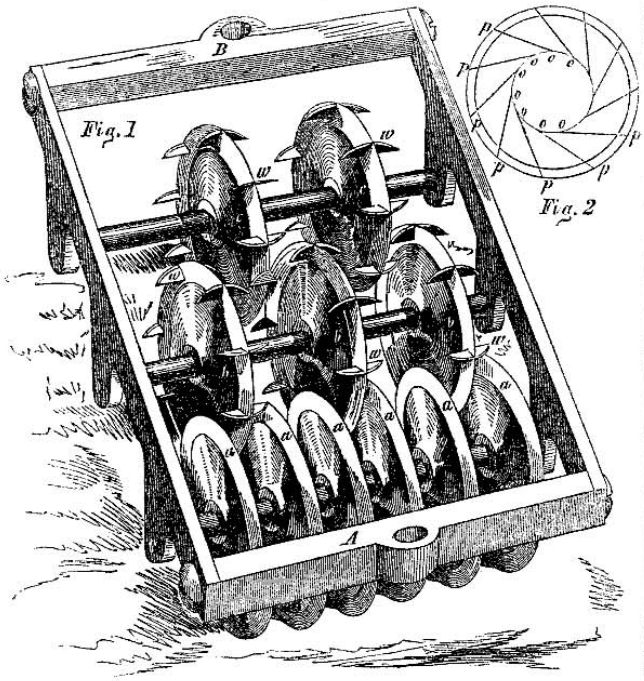
IMPROVED ROTARY CULTIVATOR.

The annexed engravings represent an improved Rotary Cultivator, the invention of H. M. Johnson, of Carlisle, Pa., for which Letters Patent were granted June 27, 1842.

Fig. 1 represents the machine in perspective, and fig. 2 represents a section, the nature of which will be shown in the following description:—

It is only within the past three or four years that this class of agricultural implements has appeared to dispute the ground so long occupied by the ordinary cultivator in general use; and in England where so much attention is be stowed upon this important branch of industry, we notice the very general introduction of the Rotary Cultivator. This improvement seems to present some advantages which are worthy of attention, and to render it more clear to the general reader we will describe its construction.

The frame, A B, supports three sets of colter or toothed wheels; the first set, *a a*, are merely circular rotary colters, and are made of the usual plow steel, or other substantial metal, as thin as is consistent with due strength, they are beveled to an edge, and at the periphery are slightly thicker than in the interior part, to lessen friction. Their distance apart may vary to suit the soil intended to be cut through.



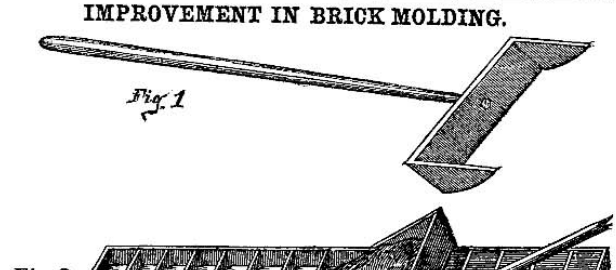
The second and third sets, *b b* and *c c*, are so placed as to come alternately in the center of the sections made by the first set, and consist of a colter precisely like those of the first set, *a a*; their edges are set with wings or knives, *w w*, projecting laterally at such an angle that, as the wheel revolves and advances, they descend edgewise with the least practical resistance, and come up flat-wise, bringing up the earth from the bottom of the cut.

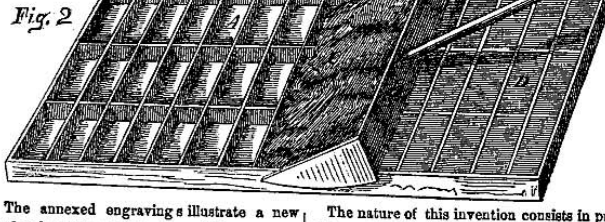
The inclination of these knives, and the effect of their position is shown in fig. 2, in which the lines, *o p*, show the direction of the plane of the knives, and their length is equal to the space between the colter, *a a*, so as to cut up all the earth as the machine passes over it.

The advantage of the circular form of knife is, that all hard substances, such as loose stone, are pressed one side, and they are made adjustable, so that if one breaks it may be conveniently replaced. The patent provides for an increase of the colters or wheels, and also for the attachment of the cultivator to a carriage, whereby it may be raised and lowered at pleasure when formidable obstacles are presented, and each colter or wheel may have a separate axle, and play up and down under the pressure of a weight or spring, thus readily adjusting itself to uneven surfaces.

Our readers will find the claim published on page 342 of this volume, and for more information in regard to rights, etc., apply to the patentee as above.

IMPROVEMENT IN BRICK MOLDING.





The annexed engravings illustrate a new mode of molding bricks, for which a patent was granted on the 20th of June, 1854, to Nathan Johnson, of Noblesville, Hamilton Co., Ind.

The nature of this invention consists in providing a frame, seen in figure 2, which is divided off into compartments, A, each the size of the brick. This frame has neither top nor bottom, it is laid down upon the level surface of the brick yard, and the compartments then dusted, preparatory to the reception of the clay. The mortar, which is first tempered so thin as to make what is usually termed *slop*, or water brick, is then brought in wheelbarrows to one end of the frame and thrown upon the same. The operator then takes the "lute,"—shown separately in fig. 1, and represented by B in fig. 2,—and pushes the mortar, O, along over the compartments, which fill up as fast as the lute progresses, leaving the compartments filled as shown at D. The lute, as it passes along, strikes off all the superabundant mortar, leaving the molds evenly and fairly filled. After the operation is completed the molds are not to be disturbed until the bricks become loose, which generally requires three or four hours, depending somewhat upon the state of the weather. As soon as the molded bricks are sufficiently loose, the molds are lifted carefully off, placed in another part of the yard, and the operation repeated as often as desirable.

The inventor claims that he can mold bricks in this manner, which, when burned, are equal if not superior in quality to any of the best machine-pressed bricks. He states that he has tested the plan thoroughly. It certainly is a cheap and rapid way of molding.

Any further information may be obtained by addressing the inventor as above.

A Hot Air Locomotive.

The St. Louis "Democrat" says: "We understand that the Ohio and Missisippi Railroad Company have ordered a locomotive to be constructed, which shall be propelled by *hot air* on an entirely new principle. Should this experiment meet with success, the use of the tender will be entirely dispensed with, and coal sufficient to take the machine to Cincinnati can be carried in a single barrel. We cannot too highly commend this Company for the enterprise which induces them to make the experiment. Railroad Companies have heretofore very strangely rejected all improvements which have been brought up and proposed for the greater perfection of the locomotive, and thus the engine now in use is the very same, with a few inconsiderable exceptions, as that first made by Stephenson years and years agone. If the experiment of this influential and enterprising Company should meet with success, it will create a revolution in propulsion such as must astonish the world, and entitle the Ohio and Missisippi stockholders to the greatest honors."

[If the stockholders of the Ohio and Missisippi Railroad will take our advice—and we think we understand this subject in all its bearings—they will abandon the "hot air" project, and thus wisely save their money for a better purpose. The magnificent failure of the "Ericsson" ought to be a warning to all on this subject. We are friendly to all experiments, but really we cannot encourage such stupendous nonsense as is here betrayed. Let the experiments be devoted to improved coal burning locomotives for generating steam, and let "hot air" alone, and the result will be much more satisfactory.

Improved Rocking Chair.

By this invention, a complete rocking-chair is so formed that when not required for use it may be folded up and packed away in a trunk, or it may be extended to form a comfortable couch. Abel Russell, of Brooklyn, N. Y., is the inventor, and has taken the necessary steps to secure a patent.

Sub-Marine Telegraph.

The Halifax "Colonist" learns that the submarine cable forming part of the line of telegraph connecting Nova Scotia and New Brunswick with Prince Edward's Island, has been parted about two miles from the N. S. shore, and is doubtful whether it can be repaired the present season. It is also said that the idea of connecting Newfoundland with Prince Edward's Island by sub-marine cable has been abandoned, and the connection with this continent, if accomplished, will now be direct from Cape Race to Nova Scotia, at or near Cape North to join the line of the Nova Scotia company.

Scientific American.

NEW YORK, SEPTEMBER 9, 1854.

The End of the Volume.

With this number closes the Ninth Volume of the "Scientific American," and its pages show abundant proof of the progress of invention during the past twelve months. No less than two hundred new inventions, requiring about seven hundred engravings, have been illustrated, besides a great variety of notices and collations from the published records of European Science and Art.

The engravings in our last three Volumes have been regarded as the finest specimens of wood cuts of machinery ever presented in any work,—this is independent of their value to our readers, which is unquestionably very great, as they include almost every variety of mechanical subjects—such as steam engines and boilers, water wheels, grist mills, lathes, agricultural implements, bridges, presses, and tools of almost every description, thus forming a valuable illustrated mechanical Encyclopedia.

In looking over its pages, the reader cannot fail to observe the great number of articles furnished by practical men, and when we speak in praise of the "Scientific American," we do not mean our own particular articles,—we are far more proud of the inventions and contributions which have sprung from the genius of the inventor and the workshop of the mechanic. The clicking of machinery and the mysterious operations of the chemical arts, are congenial to our taste; hence we naturally have an enthusiastic desire to extend this influence among our countrymen. The tendency is ennobling and keeps the mind above the more gross materialism of the age in which we live. This is one reason why we so often seek the influence of our readers in extending the circulation of the "Scientific American."

We could give the names of a great number whose latent genius was first stirred by its influence, and who, from working journeymen, have become manufacturers, and superintendents, and whose circumstances have been bettered a thousand-fold. If this ought not to encourage us to do our best, then we should be unfit to conduct any public enterprise.

To our intelligent corps of contributors we are under special obligations, which it would be ungrateful in us not to acknowledge.

We have received during the past year many congratulations for exposing errors in science—falsely so called—and schemes of a plausible character, calculated to mislead the public. This affords us pleasure, but in so doing we have only performed a simple duty. Unless we could feel a boundless freedom in criticising and exposing such schemes, we should not do our duty to the public, and certainly we have no wish to serve the people in any other capacity as journalists. Our responsibilities increase with our circulation, and like a balance wheel in a machine, happily our experience grows with those responsibilities. More labor, care, and means will therefore be devoted to make our next volume still more worthy of the confidence and support of the people.

Mortality among Mechanical Publications.

It is no easy matter to sustain a paper devoted to mechanics and inventions; of this we have had abundant evidence. At present, we remember some fifteen periodicals of this class, which have come and gone; viz., the "State Mechanic," "Mechanic's Advocate," and "Mechanic's Journal," Albany, N. Y.; "New York Mechanic," "Farmer and Mechanic," "Scientific Mechanic," "American Artisan," and the "Engineer," New York City; "American Cabinet," "Crystal Palace," Boston; and "Inventors Journal," Baltimore—all weekly publications. Of monthlies there have been, the "Eureka," "Mirror of the Patent Office," "Appleton's Mechanics' Magazine," and the "People's Journal," New York; besides three or four "American Mechanics," published in as many different places.

At present the "Scientific American" is the only weekly publication in this country devoted to mechanical and scientific subjects; and of the monthlies the "Old Franklin Journal," and the "Young Polytechnic" are the only representatives left. The "People's Journal" was issued at $1 per annum, and undoubtedly attained the largest circulation of any of these monthlies; this was owing to its extremely low price and the industry of its publisher, who could not have realized any satisfactory reward for his time and trouble, and gave it up, like a wise man, for a better business. The "Eureka" and the "Mechanics' Magazine," lived through three volumes before they were suspended, and it is reasonable to suppose that if they had been well supported they would not have been discontinued. A great deal of money has been wasted upon unsuccessful journals of this character, and the task of sustaining them is one of extraordinary difficulty, and requires money, talent, energy, tact, industry, and, above all, fearless honesty in dealing with the subjects brought forward for discussion. It is much to be regretted that so many scientific cotemporaries have dropped as it were into a brief fatality from which there was no rescue.

We have made these statements for the purpose of showing our readers the great necessity of their being equally interested with us in sustaining a paper devoted to American Inventions, Science, Manufactures, and Art. It is humiliating for any paper to appeal to a certain class for its support simply because it pretends to an advocacy of its peculiar interests without possessing the merit necessary to recommend it as such. No paper deserves to be supported irrespective of its own worth, no matter what its object may be. It is the duty, however, of every mechanic, to acquaint himself with what is transpiring in the way of improvements and inventions in all parts of the world, and this he cannot do unless he reads a paper devoted to this branch of literature.—When there is a good periodical of this kind published in any country, the mechanic who does not subscribe for and read it, stands in his own light. With respect to his business, he is just like a merchant who attempts to buy and sell stock without looking into a newspaper to know the state of the markets, and what is doing in the commercial world.

The Circulation of the Scientific American, A Word to Advertisers.

In commencing a new volume of the "Scientific American," we shall print weekly about 30,000 copies. Subscribers have already come in so briskly that we have a demand for 20,000 copies on the first number. This number is larger in proportion than former years at the commencement of the volume, from the fact that the subscribers to the "People's Journal" (which has suspended publication) are to be supplied with the "Scientific American," which of itself will augment our circulation nearly 8000. Last year we received within two months from the date of the first number, 7000 subscribers, all requiring the back numbers from the commencement of the volume, and many, we regret to state, could not be supplied, as the editions of the first numbers were exhausted before we were scarcely aware of it ourselves. This year we have calculated upon 10,000 subscribers after the first number is published—3000 more than last year—and we think we have reckoned upon a sufficient number for the demand. Still we cannot but admit our selfishness in hoping that the demand may exceed the supply. Having stated what our circulation is at present, and what the prospects are for its increase, we would state to advertisers, that in future advertisements will be inserted at a charge of 25 cents per line, each insertion, instead of 18¾ cents, as heretofore, and the amount payable in advance.

The increase of our circulation by the supplying of the subscribers to the "People's Journal," is sufficient in itself to warrant the increase of rates, and whatever number of subscribers we receive on volume 10 over the number on volume 9, will be so much clear profit to the advertisers, as they can calculate for themselves, and we expect, and have provided for 3000 extra for their benefit, and still hope for more.

Gas—Heating Houses.

The New York "Tribune" of the 18th inst., in alluding to some inventions that are wanted, says of gas:

"There is a point in connection with the subject which deserves attention by American inventors. We need a burner which shall regulate the flow of gas at the jet, and effectually prevent the escape of any gas without perfect combustion. A heavy pressure is always put on by the gas companies, causing nearly one half of the whole quantity to pass off unconsumed. Their business is to sell gas, ours to purchase it, but not any more than we can use. Yet under the present arrangement of gas apparatus, we are entirely at the mercy of the companies who sell it."

American inventors have already directed attention to this point, and if the "Tribune" will examine page 380, this volume of "Scientific American," the editor will find an account of a burner to effect this object. Other burners have also been invented to meet the desideratum here urged.

With respect to heating houses, the "Tribune" says:

"English mechanics are now suggesting the feasibility of supplying heat to dwelling houses as well as gas, and by the same agency, that is, the circulation of steam or hot water through metal pipes. Doubts have been cast on the possibility of using water or steam to this extent. Condensation of the steam is predicted as certain to occur before it has traveled any distance from the boiler. Some trials, however, seem to dissipate these doubts. A very satisfactory illustration of its feasibility is seen at the Pennsylvania Insane Hospital, near Philadelphia, and the proprietor of an extensive steam saw-mill at Burlington, New Jersey, has successfully conducted the waste steam from his engine through metal pipes laid underground, a distance of some 900 feet, into his dwelling-house, where it performs all the important parts of washing, boiling, and diffusing a gentle and equable temperature in every room into which the pipes are introduced."

We suppose that there are few woolen or cotton factories in our country but what are heated with steam. It is no new thing this; either heating buildings with steam or hot water. Both plans have been practiced for forty years at least. Count Rumford was the first person who devoted his attention to this subject, and we have seen a building heated with steam, which was planned by him and has been in use ever since. All the ferry steamboats are heated with steam during winter, and all the exotic vineries of our merchants in this city, are heated with hot water. We are glad, however, that the "Tribune" has directed attention to the subject at present, as the system, if it can be carried out for private dwellings, will be the means of effecting a great amount of good. But we also know that efforts have been made in this city for the past three winters to carry it out, and we are not indebted to mechanics on the other side of the water for such suggestions. To carry it out successfully, however, means must be provided for cooking as well as heating, in private dwellings.

The New Patent Bill—A Bad Provision in it.

We have received a copy of the new Patent Bill, with the amendments, and it gives us no small amount of pleasure to see that the committee of the Senate has proposed to strike out nearly every objection that we pointed out when commenting on it. There are still some very objectionable provisions remaining in it, which we commend to the serious attention of that committee. In section 28, it is provided that in equity, "it shall be competent for the court having jurisdiction of the cause to enquire into the damages sustained by the plaintiff, *either by reference to a master*, or by directing an issue to a jury." The words in italics should be struck out, they will create disturbances, if retained in the bill. Such a power puts the court in the place of the jury, and violates a well known principle of common law, which has been in force ever since the first patent law was made. We do not like it, and we are confident that the people will not like it. Such issues should always be left to a jury and not to an appointee of the court.

Unclaimed Models.

Upon taking an inventory of the models remaining in our office, which have been accumulating for the last nine years, we find that the number remaining in our possession amounts to about fifteen hundred.

These models have been sent to us by inventors from all parts of the United States. Some of these are beautiful specimens of workmanship, and are displayed upon shelves to ornament our office, and others are of no value whatever, and are packed away in promiscuous disorder. To those who value their models sufficiently to pay the expense of transportation, we would advise them to order their return, and we would further suggest that in writing for them they should specify particularly what the model is, how it is constructed, (for we may have several under the same title) and how it shall be sent, and we will box it free of expense, and deliver to any Express or transportation line in the city. After this notice, parties who fail to order their models returned to them within three months, must not complain if they are not afterwards able to obtain them, for the quantities now on hand, together with those daily received, are getting to be too numerous and occupy too much space to be year after year stored at our expense, and the most worthless ones we shall from time to time destroy, unless they are sent for within three or four months, after written to that their inventions are not patentable.

To Our Cotemporaries.

We are under renewed obligations for the many kind words spoken of us during the past year, and especially are we grateful for the flattering manner in which they have received the prospectus of our coming volume. It shall be our object to retain the confidence of the press, and although we may sometimes come in collision when discussing prominent scientific subjects, yet it is always with us a mere difference of opinion, and nothing more, and in no instance can we recall an interruption of the *entente cordiale* with any of our brethren of the press. Every respectable newspaper in the country has our warmest wish for its success, and for the favors extended to us we hope always to feel deeply grateful.

Gratuitous Subscriptions.

An institution in the city of Philadelphia, numbering five hundred members, requests us, through its Secretary, to send them the "Scientific American" as a gratuity—this may appear very incredible but it is nevertheless true. Now as we do not do business in this way, and failing to perceive any reason in the request, we must respectfully decline it.

We are often "bored" by just such applications—perhaps amounting in all to one hundred each year. Our terms are two dollars per annum, in advance, and we hereby give notice to all public institutions, that we shan't send the paper unless the *quid pro quo* is duly forthcoming, perceiving no reason why we should supply five hundred readers for nothing and at the same time refuse to do the same for one.

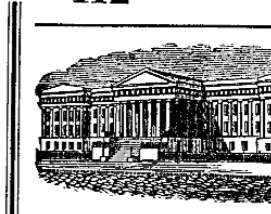
$570 IN PRIZES

The Publishers of the "Scientific American" offer the following Cash Prizes for the fourteen largest lists of subscribers sent in by the 1st of January, 1855.

$100 will be given for the largest list,	
$75 for the 2nd.	**$35 for the 8th,**
65 for the 3rd,	**30 for the 9th,**
55 for the 4th,	**25 for the 10th,**
50 for the 5th,	**20 for the 11th,**
45 for the 6th,	**15 for the 12th,**
40 for the 7th,	**10 for the 13th,**
and $5 for the 14th.	

The cash will be paid to the order of each successful competitor; and the name, residence and number of Subscribers sent by each will be published in the "Scientific American," in the first number that issues after the 1st of January, so as to avoid mistakes.

Subscriptions can be sent at any time and from any post town. A register will be kept of the number as received, duly credited to the person sending them.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING AUGUST 29, 1854.

HOG PENS—R. M. Abbe, of Thompsonville, Conn. : I claim the swinging guard of the pen, in the manner set forth.

CULTIVATORS—Wm. T. Bazemore, of Bibb Co., Ga. : I claim the form of the hoes and the arrangement of the rods, by which arrangement the hoes are made adjustable and yet may be held stationary.

WASHING MACHINES—Wm. Biddle, of La Fayette, I nd. : I claim the combination of the vibrating bar, and vibrating wash board, with the lever described ; the vibrating wash board having its jointed attachment nearer to the center of motion of lever than the bar, so that in the motion of the lever back and forth, the clothes shall be griped and released between the board and bar, as set forth.

MAIZE HARVESTERS—G. A. Bruce, of Mechanicsburgh, Ill. : I claim the combination and arrangement of the oblique revolving cutters, revolving inclined directing shafts, herding and holding arms and inclined guides, as set forth.

SPIRIT LEVELS—Lebbeus Brooks, of Great Falls, N. H. : I do not claim the combination of a circular divided limb or plate and a spirit level with a bar or beam.

But I claim the combination therewith of an index bar, its divided sectoral arc or limit, and its locking plate and spring catch, or the mechanical equivalents for such locking plate and catch, the whole being made to operate together as specified.

WINDOW BLIND HOLDER—E. W. Bullard, of Hardwick, Mass. : I claim a blind fastener constructed and operating as described ; the same consisting of the swivel box with its projection or hasp turning freely upon, and when the blind is opened or closed, rigidly held by the angular rod, the said rod having a bearing upon which it swings in the projecting plate, as set forth.

FASTENING SKIRTS TO SADDLE TREES—J. C. Dickey, of Sandy Hill, N. Y. : I do not claim the combination of an elastic clamp plate with projections on the underside of a saddle tree for the purpose of fastening the skirt to the tree, and giving the saddle an adjustable bearing upon a horse, as in the case of Robert Spencer, patented Aug. 6th, 1850.

But I claim the combination of the teeth upon the elastic clamp plate, by which means it is held immovable in its position upon the leather with one or more screw or screws, or their equivalent, to draw the spring clamp plate and jockey plate together for fastening the skirt to the saddle tree, whether the jockey plate be adjustable or otherwise.

STAVE MACHINE—I. B. Dudrey, of Athens, Ohio : I claim the mode as set forth, of sawing logs or blocks both ways, by means of two circular saws so arranged and operated that the saws shall cut alternately in opposite directions, by being carried to and from the log or block as it moves back and forth, using therein any well known mechanical means for effecting the same.

STAVE MACHINE—I. B. Dudrey, of Athens, Ohio : I claim the employment of two knives substantially of the form and action set forth within the curved jaws of a vibrating cutter head for cutting the staves both ways, that is, in the back and forth motion of the cutter head, all in the manner set forth, and in combination therewith I claim the curved guides or guards, for holding the stave when the same has passed the feed rollers, for the purposes set forth.

PLOWS—O. G. Ewings, of Heart Prairie, Wis. : I claim the jointed beam in combination with the adjusting screws, as described.

MANURE AND LIME SPREADERS—I. W. Fawkes, of Christiana, Pa. : I am aware that a perpendicular sliding diaphragm has been employed to rise or fall, and thus regulate the feed, and that fixed wires have been used both in the hopper and under the feed cylinders, therefore I do not claim any of these devices. Neither do I claim the rollers as such.

But I claim constructing the hopper with a swing diaphragm or dividing board, by which the material intended for spreading is prevented from arching.

I also claim the arrangement and combination of the moving breakers or pulverizers (actuated by the device described) with two rollers for the more effectual distribution of the contents of the hopper.

GUIDING CROSS CUT SAWS—R. Fanning, of Clarksfield Ohio : I claim, first, the hanging of the saw frame in the sash beam by means of a vertical slot, the curvilinear slide and the guides, in the manner described, so that a backward and forward movement of the saw in a direct line is effected in combination with a rocking movement of the same.

Second, the combination of the hand lever with the sash beam, for the purpose of regulating at pleasure the feed of the saw.

Third, the arrangement of the sash beam so as to be elevated or depressed by turning on a pivot or journal in combination with the movable frame sliding in the grooves, for the purpose of rendering the saw adjustable to and capable of operating upon logs or timber of any dimensions and in various positions, while at the same time the movement of the saw is always kept in a line with the direction of the pitman, whatever may be the size or position of the timber to be cut.

LEATHER SPLITTING MACHINE—J. F. Flanders and J. A. Marden, of Newburyport, Mass. : We claim the use of the continuously revolving or endless bob knife as applied to machines for splitting leather and operating in the manner as set forth.

BEDSTEADS FOR INVALIDS—J. T. Forbes, of Coburg, Canada West. Patented in Canada Feb. 2nd, 1854 : I claim in combination with the arrangement of the shaft, gear and rock shafts, the rock shaft with its attachments, by which the invalid can move the head and foot boards himself.

CAST HINGES—Nelson Gates, of Cincinnati, Ohio : I do not claim casting the hinge all at once without a pin by inserting in the mold blocks passing through certain of the sections of the knuckle and having concave recesses or convex projections to receive corresponding recesses or projections on the ends of the knuckle pieces, neither do I claim the employment of washers between all the joints of the knuckle when a pin is used in connection with such washers.

But I claim the employment within any number of joints in the knuckle of a hinge of several metal washers which are of concave-convex or other form, which renders them capable without any assistance of serving as a pivot or center of the hinge, as set forth.

SLIDE VALVES FOR STEAM ENGINES—John Gleason, of Northfield, Vt. : I claim, first, the valve constructed as described, in combination with the cavities in the covering plate and the enlargement of the steam parts, as set forth

Second, in combination with the cavities in the covering plate and the passages in the valve, I claim the safety valve placed on the top plate for the purpose of allowing the steam to escape from the cylinder into the steam chest, when the pressure in the former exceeds that in the latter.

MANUFACTURE OF INDIA RUBBER—Daniel Hayward, of Providence, R. I. : I do not claim the curing of india rubber in its natural state when compounded with sulphur and lead, by the use of heat or of steam, nor do I claim the compounding of sulphur, white lead, or coal tar, with india rubber, all these having been the subjects of previous patents.

But I claim the improvement in the process of vulcanising native india rubber, or rubber once vulcanized, compounded with other articles, as set forth, which consists in heating and curing them with steam and under pressure, and in regulating the application of steam and the induration of the product by the introduction of steam and water, as described, by which a very great saving is made in the time and fuel required for the process, as stated.

SEED PLANTERS—S. M. Hockman, of Tonis Brook, Va. : I claim the inclined traversing or agitated screen, or its equivalent, to separate the refuse or other matter which is too large to pass through the openings which graduate the quantity spread upon the ground, and thereby prevent such openings from becoming choked.

I am aware that radial scores on a plane surface are described and represented in Francis Van Doren's patent of the 13th of April, 1852, therefore I do not claim radial scores on a plane surface.

But I claim making radial scores on a somewhat convex surface, so as to distribute the grain and manure more uniformly, as described.

MANURE EXCAVATORS—A. R. Hurst, of Harrisburgh, Pa. : I am aware that a device similar to the toothed bar has been employed in harrows and cultivators, and therefore I do not claim the same as used in such implements.

But I claim the combination and arrangement of the swinging toothed cross bar, carriage, and swinging stop bar, so as to form an instrument for excavating or loosening and separating the particles of manure with ease and facility, as described.

SEED PLANTERS—John H. King, Jr., of Georgetown, D. C. : I do not claim solid scatterers such as are used in the lime spreader of J. Hatch, patented Aug. 17, 1835, and also shown in the rejected application of M. D. Wells. Neither do I lay any claim to the use of sieves or screens above the hopper.

But I claim the employment of the adjustable scatterer, as described, for insuring the even distribution of the various seed and manures passed through the apparatus, as set forth.

LAMP FILLERS—C. R. Landmann, of New York City : I claim the use of the safety-filling apparatus, made and operating as set forth, in combination with a filler case.

DIES FOR MAKING AUGERS—E. L'Hommedieu, of Chester, Conn. : I am aware that the swaging of the lip and head of an auger by dies is not new ; when employed they have not formed the whole of the hollow or recess of the auger head, as what was below the shank afterwards had to be removed by a file or chisel. Therefore I do not claim the mere employment of dies in such way, to swage out the lip and head of an auger, and a part only of the recess or cavity of the head.

But I claim the peculiar arrangement of the shank entrance of the matrix, that face of it against which the hollow surface of the auger head rests and is formed, and the male die which forms the hollow or recess of the head, the same enabling me to make an auger head not only with the whole of its recess stamped or formed by dies, but having its shank at the proper turning angle with respect to it.

HARROWS—John G. McCauley, of Stone Bridge, Va. : I claim constructing the double tooth so that one portion may operate on the ground and the other be in reserve, and also serve as a shield to confine the tooth to the beam in connection with the hand and key.

BINDING FOLDER—John B. Nichols, of Lynn, Mass. : I claim the binding folder constructed to guide and fold, as described, whether used in connection with a sewing machine or with any other mode of fastening the binding after it is folded and applied.

PLOW FOR PLANTING POTATOES—Whitman Price, of Goldsborough, N. C. : I am aware that double mold-boards, and also mold-boards so curved as to somewhat dress the top of the furrow, have been used ; these devices, therefore, I do not claim.

But I claim the particular form of skimmer plate, in combination with the mold-boards, tree, and shovel, as set forth.

SEED PLANTERS—Wm. Redick, of Uniontown, Pa. : I do not claim any of the devices described when used separately or in any combinations of them other than represented.

But I claim the specific arrangement of the cams on the axle, the markers on the periphery of the carrying wheel and the valves at or near the bottom of the seeding tubes, with their several operative parts, for the purpose of causing regularity in the marking and dropping of the grain, regardless of the varied speed of the horses drawing the machine, as set forth.

SAW MILL DOGS—Titus H. Russell, of Taftsville, Vt. : I claim the device described to keep the hinges of the dogs tight, and thereby more effectually maintain the straightness of the saw kerfs, and uniformity in the thickness of the lumber.

I also claim the construction of the slide which carries the dog of the head block with a broad platform to support the dog firmly against lateral pressure, and a long narrow arm to extend back of the saw race to the opposite end of the clock, the wide and narrow portions of the slide moving on parallel guide rails of corresponding width, whereby the dog while necessarily limited to a short support on that end of the head block on which it rests, is by the supplementary slide arm seated as firmly on the block as if its slide could be made to extend across the saw race, thus avoiding the binding and other difficulties which have heretofore existed for want of length and firmness in the sliding dogs of the head blocks.

TENONING SPOKES—R. L. Silbet, of Shippensburgh, Pa. : I do not claim the plane, for they have been previously used, or similar ones in joinery.

But I claim securing a series of spokes upon a board or plate provided with ledges or projections, adjustable gauge block, guide strip, cross-piece, cross bar, and block, all constructed as set forth.

CORN SHELLERS—A. J. Smith, of Piqua, Ohio : I do not lay claim to any of the parts of this apparatus except in their mutual application and relative construction, as combined.

But I claim the yielding guard board having its rear edge somewhat elevated and hinged to the frame, and resting by its front edge upon the rear portion of the shaking continuous carrier, so as constantly to fill the varying interval between the said carrier and the shelling concave, for the purpose described.

VALVE FOR HYDRAULIC RAMS—J. C. Strode, of West Chester, Pa. : I claim the construction of puppet valves of hydraulic rams with the upper part of the valve sliding in contact with the sides of the valve chamber, and the part F and G made conical or tapering, in the manner described.

CHAIRS FOR EXERCISING—Joshua Stevens, of Chicopee Falls, Mass. : I do not claim arranging the seats of exercising chairs for young children upon springs, as they have been thus arranged heretofore.

But I claim a nursery chair for exercising, amusing, and weighing young children, having its parts arranged and operating, as described.

BREAST CUPS—Elisha Waters, of Troy, N. Y. : I claim connecting the chamber of the diaphragm pump with the breast cup by means of the curved exhaust tube, by which the said breast cup can be nearly filled with milk from the breast without allowing any portion of its contents to flow into the chamber of the pump, which prevents the necessity of frequently removing the cup from the breast whilst using the instrument, as set forth.

I also claim the arrangement of the said breast cup and curved exhaust tube, with the described diaphragm pump, as set forth, by which the patient is enabled to use the instrument without the aid of an assistant.

HORSE SHOEING APPARATUS—Noah Warlick, of Lafayette, Ala. : I do not claim the supporting of the horses hoof by a stand during the shoeing operation

But I claim the described head piece with the adjustable slide constructed and arranged, as set forth, for adapting the apparatus to hoofs of every size.

CUTTING TENONS.—Chas. P. S. Wardwell, of Lake Village, N. H. : I claim, first, the manner herein described of combining and arranging the squaring off saw, vertical shoulder saws, horizontal tenon saws, or horizontal saws and cutters combined, so as to constitute a machine which is capable of completing the tenon or tenons before the rail is discharged, for the purpose described.

Second, I claim in the manner described of combining and arranging the saw arbor, or swinging frame, slotted segment lever, and set screw, for the purpose of facilitating the operation of adjusting the shoulder saws or tenoning saws, as described.

Third, I claim the employment of one or more cutters between the horizontal tenon saws, in combination with the shoulder saws, for the purpose of cutting two or more tenons on each end of the rail at one operation, as described.

HYDRAULIC RAM.—J. D. West, of New York City : I do not confine myself to the precise position of the rod as shown, for that may be differently arranged.

But I claim having two valves placed at the ends of a rod, the valves being fitted at the ends of passages which are connected by branch pipes to a main pipe leading from the spring or source, said valves being constructed and arranged, or in an equivalent way, and operating as set forth.

COUNTER TWIST SPEEDERS.—Jesse Whitehead, of Manchester, Va. : I claim the combination of the upper bobbin shaft with the curved, overlapping bobbin bars, arranged and operating as described.

NAIL MACHINES.—John Wootton, of Boonton, N. J. : I claim the two pairs of segmental rolls, combined, arranged, and operating so that the first pair brings the nail or spike nearly or quite to the desired form, and the second may complete it, and by the reversed position finish off the finned, teeth red, or ragged corners which were formed by the junction of the former rolls as set forth.

GOVERNOR FOR WINDMILLS.—Daniel Halladay, of Ellington, Conn. : I do not claim attaching the wings or sails to spindles which turn on their axis, irrespective of the arrangement for turning said spindles in order to give them the desired obliquity, and thereby presenting a greater or less surface to the wind.

But I claim attaching the spindles of the wings or sails to a sliding head by means of levers, or their equivalents, and operating said head by means of the lever or its equivalent, and a governor of any proper construction for the purpose of giving the desired obliquity to the wings or sails, and thereby ensuring an equal motion of power during the variable velocity of the wind.

FURLING AND UNFURLING WINDMILL SAILS.—Thos. C. Vice, of Rochester, N. Y. : I claim the clothing and unclothing of windmills while the vanes thereof are in motion or at rest, by means of an iron rod passing through the main hollow vane shaft, in connection with a bevel gear and pinions attached to their respective rollers, to which rollers are fastened reefing lines connected with the sails in combination, as set forth.

SEWING MACHINES.—S. Turner, of Westborough, Mass. : (Assignor to Elnur Townsend, of Boston, Mass.) I claim constructing the feeding wheel in the form of a toothed annulus, or ring gear, or the equivalent thereof, and connecting it with the feeding shaft by a universal joint or ring, and two sets of journals applied together and made to operate as specified, whereby the cloth or material to be sewed can be readily turned in any direction, without the necessity of lifting the presser or presser wheel, as would be required in the performance of such an operation on various sewing machines.

GLASS LANTERNS.—A. Morley, (Assignor to James Bright,) of Brooklyn, N. Y. : I claim a lamp and lantern of any desired configuration, when made of glass and in one piece, as described.

LARD LAMPS.—H. Chamberlain, of Boston, Mass. : (Assignor to Wm. R. Mesliurul, of New Haven, Conn.) I claim the above described improved lamp for burning lard or concrete fatty matters, made with an arrangement of its wick tubes, the lard reservoir, and the supporting bifurcated stand, as described, and with the reservoir applied to the stand so as to turn on centers and be fastened in position under any inclination or elevation of the lamp and burners, as specified.

DRESSING SHIP TIMBER.—J. E. Crowell, (Assignor to Himself, Edmund Smith, and Chas. T. Stickney,) of Salem, Mass. : Now as a principal feature of my machine in which I claim there is any particular novelty, I claim the mode of supporting and guiding the movable carriage which carries the timber that is to be dressed, such consisting in employing four movable rails, arranged and applied together and made adjustable, so as to make the carriage during its longitudinal movements not only have a transverse dipping movement but also a longitudinal dipping movement, or such movements as will enable it to present to the cutter wheels in a proper manner the waved surface to be dressed.

I am aware that in machines for turning irregular forms a pattern rail may have been used, or that a carriage may have been supported so as to have vertical movements on stationary guide or pattern rails, but that straight rails arranged and made adjustable with respect to one another, and applied to a carriage so as to regulate its movements, as described, have been used, is not known to me.

I therefore claim this improvement as my invention in the machine set forth, for reducing or molding timber.

MULTIFORM MOLDING PLANE.—Thos. Worrall, (Assignor to Mifflin Paul,) of Mount Holly, N. J. : I claim the slide attached to a plane by means plates and screws, which will make that plane capable of working all kinds of grooves, fillester, and moldings.

DESIGNS.

FRONTS OF CLOCK CASES.—Nicholas Muller, of New York City.

COOKING STOVES.—Amos Paul, of Newmarket, N. H.

NOTE.—Just one third of all the patents in the above list were applied for through the "Scientific American" Patent Agency.

Our business in this line is rapidly increasing, and our facilities or preparing cases without delay cannot be equalled. As as evidence of this fact we will state that sixty cases were prepared during the month of August, a larger number we will venture to say, than were ever before presented to the Patent Office through one agency, within the same length of time. We are at all times ready to advise with inventors, and will undertake to give opinions upon questions of novelty free of charge. Circulars of information are also furnished gratuitously upon application.

Money received on account of Patent Office business for the week ending Saturday, Sept. 2 :—

H. W. P., of N. Y., $130 : J. S. R., of Ct., $25 ; J. S., of Mass., $30 ; E. H. S., of N. Y., $15 ; J. S. A. of N. Y., $30 ; E. Y., of Pa., $30 ; W. W., of N. Y., $55 ; S. F., of Ind., $30 ; J. Y., of Pa., $25 ; W. H. A., of N. Y., $15 ; H. & K. of N. Y., $15 ; A. D., of L. I., $400 ; J. S., of Ga., $10 ; I. P. M., of Ct., $55 ; H. B., of Ind., $55 ; H. & A., of N., $10 ; L. H., of N. Y., $25 ; J. G. S., of Mo., $55 ; D. B. N., of O. $25 ; S. B., of N. Y., $55 ; T. & A., of N. H., $50 ; J. B., of N. Y., $25 ; W. M. W., of N. Y., $27 ; A. R., of L. I., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Sept. 2 :—

J. Y., of Pa. ; A. S., of O. ; J. S. R., of Ct. ; J. B., of N. Y. ; H. & K., of N. Y. ; J. J. L., of N. Y. ; J. S., of Ga. ; F. D., of Va. ; A. L. P., of Ct. ; D. B. N., of O. ; A. R., of L. I. ; A. D., of L. I.

Hammer for Dressing Millstones.

An improved hammer has recently been patented in France, to protect millstone dressers from the injurious effect of the silicous dust which gets into the mouth and lungs, causing so much disease. To the ordinary hammer is attached a small reservoir of brass or tin-plate, it has a hole through it exactly like that in the iron one, into which the handle is made to fit. An orifice is made in one side of it for the introduction of water, which is closed by a screw-tap—at one end there is a fine capillary hole through which water can be forced by the shock of the blow with the hammer, but through it air cannot pass, the effect of the water is to form a paste of the silicous dust which prevents it from flying about. It is said to work with admirable success.

Lubricating Oil.

A foreign exchange recommends oil obtained by the distillation of common rosin, with from five to ten per cent. of quick lime, as a good material for greasing machinery. As it is generally slightly acid, even when distilled with lime, it is recommended to add from two to five per cent. of lime or magnesia to the cold oil, which unites with the free acid, and gives the whole mass the consistence of butter.

Fires, Fires.

No country in the world is so much afflicted by extensive conflagrations as ours. We cannot tell at present, but judging from the destructive fires with which New York has been visited last year, and the accounts we have received of fires in other places, we presume that no less than $20,000,000 of property has been thus consumed. This is all a dead loss to the country, and tends greatly to retard its prosperity. The real amount of suffering arising from fires is beyond calculation. Many of them are caused by a wilful application of the incendiary's torch ; and more by carelessness than accident. In France and England, not one house is destroyed by fire for a hundred in the United States. Indeed, we are assured that in the city of Paris not more than one building is burned in three years, while in New York it is rather a wonderful thing if one is not burned down every day. The character of the buildings in the two cities accounts for this in a measure, most of the houses in Paris having thick stone walls, with very little wood in their composition. Many of the fine new buildings which have been erected in New York City, within the past five years, have excellent stone walls, but as a general thing, while the outside of our buildings look solid and well, too much timber is employed inside. During the very severe drougths which have so generally prevailed this summer, it caused us no small amount of grief to hear of so many severe fires in different places. Last winter tens of thousands of bushels of corn and wheat, and thousands of barrels of flour were consumed by fire in ships, and store houses in this and other cities. Owing to the general failure of crops this year, every bushel of grain that will be consumed by fire through carelessness, should be considered an act of sacrilege. In directing attention to this subject at present, it is for the purpose of beseeching our people to be less reckless of fires, for we believe, that although so much timber is used in buildings in our country, that with more care and watchfulness, we should not have one fire for ten that we now have. Houses inhabited by owners are not so subject to being burned as those inhabited by tenants. This shows that those who have a personal interest in the dwellings they inhabit, are far more careful of fires than those who do not have such an interest. Trust not in fire engines and annihilators to put out fires, but bend every effort to prevent them.

Save Coal.

The price of coal being so high this fall, it becomes all those who use it, to do so with the utmost economy. We believe that at least one-fourth of the fuel used by almost every family might be saved. In order to show how coals ought to be burned scientifically, so as to save fuel, we will present an essay of Prof. Arnot on the subject, with an illustration, in the first number of our next volume.

A Locomotive Feat.

A locomotive on the Columbus and Erie railroad, in Ohio, lately performed the feat of running two hundred and sixty-five miles with but a single tender of wood. This fact shows to what an extent the saving in the mere article of fuel, in the hands of prudent and skilful engineers, combined with the use of good engines, can be made to lessen the expence of running railroads.

[We have seen the above in quite a number of our exchanges, but we place no confidence in its correctness.

Back Numbers and Volumes.

We have the following numbers and volumes of the "Scientific American," which we can supply at the annexed prices :—Of Volume 5, forty numbers ; price in sheets, $1 ; bound, $1,75. Of Volume 6, all ; price in sheets, $2 ; bound, $2,75. Of Volume 7, all ; price in sheets, $2 ; bound, $2,75. Of Volume 8, none complete, but about 30 numbers in sheets, which will be sold at 50 cents per set. Of Vol. 9, complete in sheets, $2 ; bound, $2,75.

Subscribers who have missed numbers on the Volume just closing, can be supplied with copies to fill the vacancy, excepting the following numbers : 1, 6, 9, 11, 22, and 23.

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